High Ecological Value Aquatic Ecosystem framework

Applying the High Ecological Value Aquatic Ecosystem (HEVAE) framework to the needs of water management in New South Wales

Project description

This project identifies and defines a range of in-stream values for river reaches in New South Wales (NSW) using the High Ecological Value Aquatic Ecosystem (HEVAE) framework. When these values are used in a risk assessment framework, they enable us to prioritise areas where modification is needed the most to how we manage flows and extractions.

This project builds on former work. Assessing in-stream value and the potential risk from hydrologic stress helps us classify water sources—a key requirement of the NSW *Water Management Act 2000*. Adopting the HEVAE framework also allows us to identify environmental assets and ecosystem function, as required by the Murray–Darling Basin Plan.

HEVAE outputs are used in the Murray–Darling Basin Plan risk assessment framework for water resource planning. HEVAE mapping is also being updated to support the remaking of coastal water sharing plans. The NSW Natural Resource Access Regulator also benefits from the HEVAE data, which assists it with prioritising and assessing compliance activities.

HEVAE framework design

The HEVAE framework in NSW groups ecological value measures into four themed criteria—diversity, distinctiveness, naturalness and vital habitat (Figure 1).

Diversity

Diversity indicates a river area that exhibits exceptional diversity of species (native or migratory), habitats, and/or geomorphological features and processes.

Distinctiveness

Distinctiveness involves measuring the aquatic ecosystem for rare or threatened species, communities or habitats. It also includes rare or unusual geomorphological features.

Naturalness

Naturalness determines how much a river area has changed due to human activity.

Vital habitat

Vital habitat describes river sections that support key or significant drought-refuge areas or habitat for migratory species. Vital habitat can also be characterised by hydrologic regimes, productivity and the extent of vegetation.

A fifth criterion, ‘representativeness’, can also be applied. Representativeness is an assessment of how typical a river is of an aquatic ecosystem class. Currently there is insufficient data available to apply this to all NSW rivers.

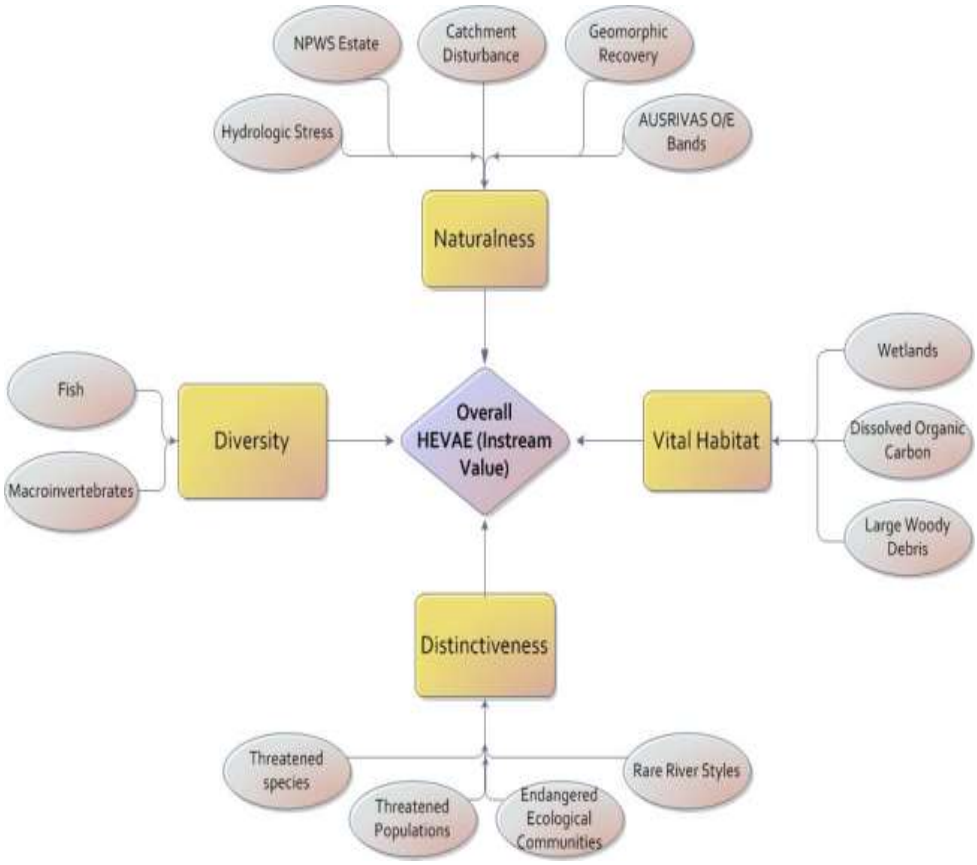

Figure 1. Application of HEVAE criteria and attributes in NSW

River geomorphology

So that HEVAE outcomes are consistent across different river reach and valley scales in NSW, the HEVAE data is attached to the state-wide River Styles® spatial layer.

The River Styles® framework describes a set of procedures to document:

- the geomorphological function and structure of rivers
- the characterisation of different river types
- the river's biophysical linkages within a catchment setting.

River Styles® mapping has been undertaken across all catchments in NSW to third-order streams and greater.

HEVAE Scoring

Data for each criterion are weighted from 1 to 4, with 1 being the highest weighting. The weighting considers the quality of the data source, the flow requirements and species' sensitivity to water extraction.

Each of the four themes are scored and then can also be combined to give an overall HEVAE instream score. The HEVAE scores are generally reported at the river reach level using mapping products (Figure 2).

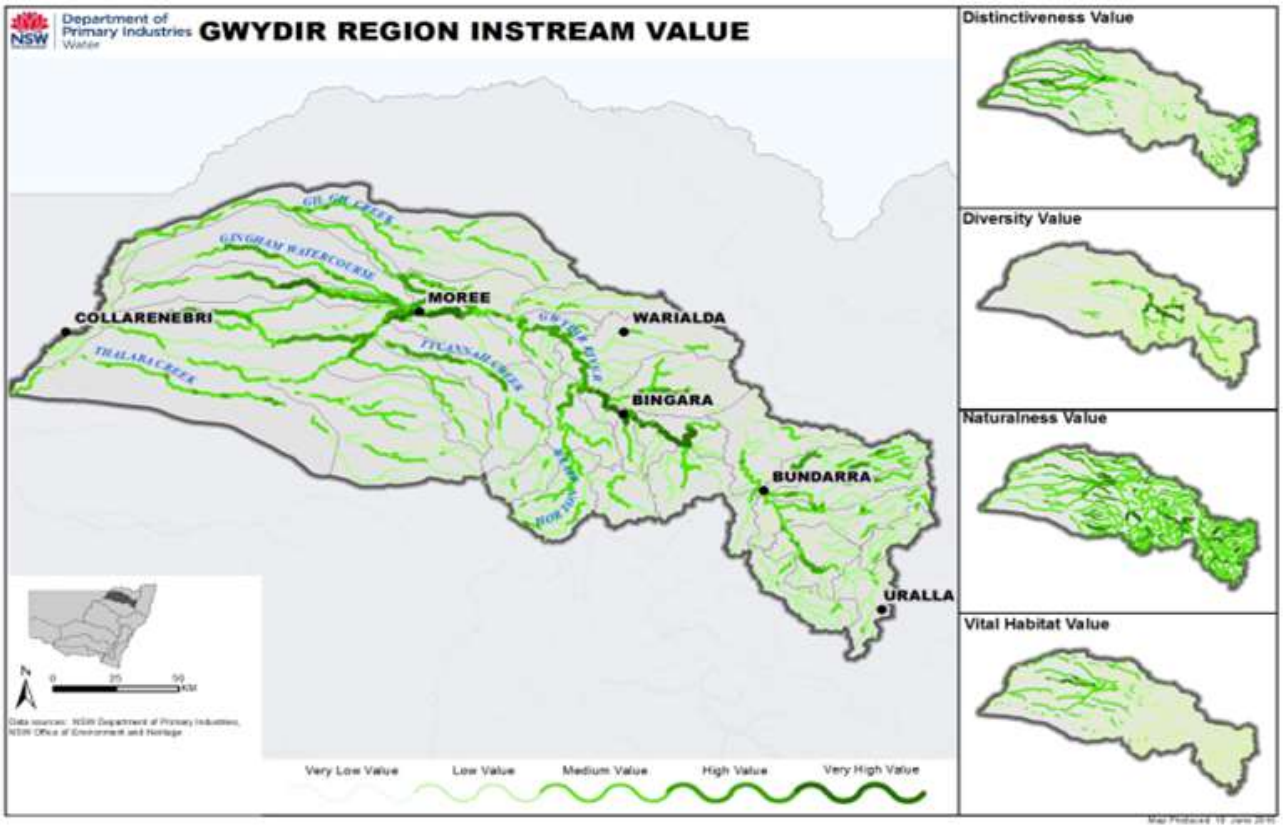

Figure 2. Example of HEVAE output at the valley scale for the Gwydir Valley.

Outcomes

The HEVAE framework enables mapping, classifying, delineating, describing and determining the condition of aquatic ecosystems in a nationally consistent manner. These outcomes inform the risk assessment framework for water resource planning. They will also be used in the development of risk mitigation strategies through the review of the water sharing plans, especially in relation to rules related to water extraction.

The HEVAE framework is adaptive and will continue to evolve and be updated as new or revised data becomes available, including recent spatial data about riverine assets. Recommendations to improve the HEVAE framework include:

- incorporating the criteria 'representativeness'
- determining the flow regime that most limits flow-sensitive attributes (to improve weightings)
- examining other datasets that could be used in the framework
- developing appropriate predictive models for aquatic biota
- developing a classification of river types that can be associated with HEVAE outputs.

The HEVAE spatial products provide an ongoing decision support tool for adaptive water management.

We will update our data to reflect the most contemporary riverine asset information.

More information

For more information about this project, contact water.science@dpie.nsw.gov.au

Acknowledgments

The HEVAE framework was established by the Aquatic Ecosystem Task Group (AETG), in response to commitments of the National Water Initiative (NWI).

The Department of Planning, Industry and Environment—Water continues to collaborate with partner agencies to collate the relevant spatial data, supporting evidence base and interpretation of spatial outcomes in the development of the HEVAE framework. The Department of Primary Industries—Fisheries provides information on fish diversity and threatened fish distribution. The Department of Planning, Industry and Environment—Environment, Energy and Science (formerly Office of Environment and Heritage) provides macroinvertebrate site data and threatened species data from the Wildlife Atlas.